

The Reinforcing Properties of Drugs of Abuse are Attenuated by Naltrexone in *Caenorhabditis elegans*

Corey A. Calhoun¹, Simon N. Katner¹, Eric A. Engleman¹, Bethany S. Neal-Beliveau²

¹ Department of Psychiatry, Indiana University School of Medicine; ² Department of Psychology, Indiana University-Purdue University Indianapolis

Drug addiction is a chronic, relapsing disease premised on compulsive drug seeking. Previous work from our lab demonstrated that the nematode *Caenorhabditis elegans* (*C. elegans*) can be used to examine the reinforcing properties of drugs of abuse. A successful model for studying the reinforcing effects of drugs in *C. elegans* would greatly aid efforts to discover potential therapeutic interventions for drug addiction. The present study examined preference for morphine, ethanol, cocaine, and a cannabinoid agonist (CB agonist) in *C. elegans* and the effect of naltrexone, an opioid antagonist, on this behavior. Six-well agar test plates were utilized to test drug preference. Each well had two circular target zones equidistant from the center; 4µl of the targeted drug or water were placed in the center of one of the two target zones within each well. Worms in one group were pre-treated with 10mM naltrexone, while controls were pre-treated with 0.97 mM HCl for 30 min prior to testing. Worms in each treatment group were then placed in the center of each well and allowed to move freely for 30 minutes-images were captured at 10 and 30 minutes. Animals treated with vehicle displayed a significant preference for the aforementioned drugs relative to controls; naltrexone pretreatment significantly ameliorated this effect. Naltrexone had no effect on food or chemoattractant preference, indicating that the effects of naltrexone on drug preference are selective and not due to disruption in general behaviors. These findings suggest that the reinforcing properties of drugs of abuse can be examined in *C. elegans* and this model may be useful for screening potential pharmacotherapies for drug abuse.